Knowledge ecology for conceptual growth

Knowledge ecology for conceptual growth: Teachers as active agents in developing a PluriLiteracies approach to Teaching for Learning (PTL)

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Abstract

This article explores how a group of educators and researchers enacted an inclusive process of conceptual growth involving teachers and teacher educators as active agents, knowledge builders, and meaning-makers in the development of a Pluriliteracies approach to Teaching for Learning (PTL). The evolution of a working model based on five emergent principles foregrounded the need for stakeholders across different languages, cultures, and disciplines, to work together from the start so that learning spaces were created where teacher development went alongside researcher development, and theorizing was not only inclusive of praxis but was validated by it. A growth cycle emerged using theories of practice as the medium for critique, disagreement, and consensus, which this article seeks to interpret through an ecological lens. The development of the theoretical constructs, therefore, involves shared ownership and is embedded in the development of pedagogic practices. This approach does not end with a theoretical model but continues growing a principled practice model which prioritizes teacher agency for further critique and development.

Introduction

This article sets out to capture inclusive processes involved in knowledge (re)building and to identify the changing practices needed to bring about a dynamic 'growth cycle' in understanding and addressing current complexities in content and language integrated learning (CLIL) classrooms. Unravelling the nature of 'deep' learning, namely, *the successful internalization of conceptual content knowledge and the automization of subject specific*

procedures, skills and strategies (Meyer, Coyle, Halbach, Schuck, and Ting 2015) in settings where a second or foreign language is used as the medium of instruction, is at the core of constructing theories of practice (Argyris and Schön 1974; van Lier 2010) which we believe have the potential to change classroom learning. This suggests a paradigm shift which moves away from a focus on learning outcomes to process-oriented teaching for learning which sensitizes learners and their teachers to understanding and creating optimal contexts for learning, prioritizes interaction, sees language as a mediating tool and promotes a better understanding of how best to learn under prevailing conditions. Theory and practice are perceived, therefore, as being interactive parts of a cycle rather than unidirectional knowledge flows.

CLIL has developed exponentially since the 1990s starting with a European pioneering movement drawing on a wide range of global bilingual education models – historic and current - to create approaches sympathetic to the European goal of nurturing multilingual citizens moving from *Linguistic Diversity to Plurilingual Education* (Council of Europe 2007). Reported successes of CLIL are well documented – especially those focusing on the motivation of learners (see for example Ruiz de Zarobe 2008; Lasagabaster 2011; Navés and Victori 2010; Coyle 2013). More recent studies, however, demonstrate less positive results and reveal gaps in our collective understanding of how contextual and pedagogic variables impact on classroom practices (see for example Harrop 2012; Breidbach and Viebrock 2012; Bruton 2013; Pérez Cañado 2016; Nikula, Dafouz, Moore, and Smit 2016). That is, as CLIL practices have evolved and as educational and political agendas have increasingly taken account of wide interpretations of CLIL on a global scale, the challenges of integrating subject learning and language learning to promote 'deep' learning, are increasingly brought to the fore. Interestingly, more recent thinking does not exclude first language as being part of this movement.

Dalton-Puffer, Nikula, and Smit (2010, 298) suggest the concept of fusion for CLIL, which implies 'a multi-perspectival view on both language and content which taken together should help us understand the fusion of language-and-content'. At the macro level, Mehisto (2015, xxi) captures the need for educational systems to involve all stakeholders in responding to and interacting with each other to develop an appropriate contextualized CLIL model based on what he terms 'reciprocal co-evolution'. In addition, a growing emphasis across nations on 'literacies' across the curriculum (UNESCO 2004; Council of Europe 2015; EU Report 2012) has led to repositioning the role of language(s) in school learning (Schleppegrell 2004; Thürmann and Vollmer 2013), especially given current socio-cultural, political, and economic factors involved in global trends which are impacting on pedagogic priorities.

Context

It is against the backdrop of a growing realization that the 'integration phenomenon' is both complex and conflicting that an alternative *modus operandi* for bringing together a wide range of CLIL perspectives and theories to 'grow' shared insights and understanding was experimented. A starting point for innovation needed to recognize gaps in our collective understanding of CLIL through considering current practices from different perspectives. According to Harrop (2012, 59) 'the tension between language and content which CLIL theoretically had resolved […] still prevails' since. Teachers do not necessarily have the understanding (Lyster, 2015) and the tools for achieving integration.This anchors the process in classroom pedagogies focusing on what van Lier (1996, 24) calls a 'practical philosophy of education' in a sense where theory, research, and practice are 'dynamic ingredients of the theory of practice' so that the implicit theories we all have are made explicit.

According to van Lier (1996, 24), constructing a theory of practice envisions teacher development as pedagogic development:

> a process of practicing, theorizing and researching. Our growing understanding of this process determines the relevance of information from different sources and disciplines [as] a mode of professional conduct which in some respects differs from traditional ways of doing theory, research or practice. In other respects, however, it is no different than any other thoughtful approach to work.

Rodgers (2006) refers to theories of practice as small 't' theories in comparison with large 'T' theories developed by 'those who spend their time creating such theories.' She suggests that a dialectical relationship which looks for meaning is required between them. This raises a fundamental question about the nature of theorizing and the dynamic systems which define and underpin its evolution. In line with Lantolf and Poehners' (2014, 27) view that practice is not the application of theory which takes place 'outside of science and which came after science' but rather is 'drawn into the scientific enterprise in a profound way', a case is made where classroom practices through ongoing dialogue shape theoretical understanding and vice versa. This resonates with Kinpaisby-Hill (2010), who describes engaging in Participatory Action Research as working in ways which do not separate out thinking and practice. She believes these processes to be: 'messy' - since society is complex and contradictory; collective - since theorizing is 'done together'; and iterative - since development is not linear. Our intention, therefore, was to explore how a convergence between building, expanding, and 'testing' boundaries might lead to shared ownership of and growth in fusing existing understanding alongside 'new and different directions' for integrated classroom teaching and learning. Such ownership foregrounds teacher agency as core to the process given that according to Priestley, Edwards, Priestley, and Miller (2012)

such agency is oriented to the future through goal setting and the ability to envisage further possibilities.

Mediated through the construction of a theory of practice and embedded in an epistemological position which involves sharing and diffusion with the wider community, a means of 'validating' the theory had to emerge. This should not be seen as separate from the practices which have led to the construction of the same theory whose objective is, using the integration of content and language as a starting point, to guide the growth of conditions for deeper learning. Knowledge ecology, therefore, according to Balsamo (2010: 430), suggests a paradigm shift which embraces a transformation of knowledge structures, conventions, and rituals in order to integrate 'information that comes from different sources, critical frameworks and academic disciplines' so that new knowledge is constructed 'in dialogue amongst disciplines, through practices of social negotiation and in creative collaboration with peers and experts'.

This was the challenge facing a trans-European group – teachers, teacher educators, researchers, and academics - who collectively saw an opportunity for exploring one such ecological approach, namely, to experiment the potential of shared learning spaces provided by the European Centre for Modern Languages (ECML) and funded by the Council of Europe over a three-year period as a means for developing new parameters in theory-oriented practices for CLIL. The core team was able to meet on seven occasions to instigate, plan, and develop the steps towards the construction of the approach. Three network meetings, lasting between 2 and 3 days were attended by between 15 and 32 participants. These meetings served to test, question, iterate, and develop understandings further with the help of academics, researchers, teacher trainers, and teachers.

Processes

In the context of the emergent principles previously discussed, a shared commitment to growth acted as launch, taking account of ecological systems where growth in some sense is cyclical. Our cycle had one objective: *to develop alternative, shared, principled guidance for CLIL teachers which would bring about a better understanding of deep learning*. Creating a democratic environment where voices were 'equal' depended on a shared learning space where different perspectives from different participants could be interwoven and critiqued. It also required identifying a set of core principles across disciplines and across cultures. Hence, the cycle which emerged (Figure 1) had five interconnected stages although none of these stages was pre-determined nor prescriptively sequential.

INSERT FIGURE 1

Realizing is the trigger which focuses on an articulation of the gaps in practice which are drawn from research studies, reported by practitioners or lived through experiences collated by stakeholders, in the process of teaching and learning in CLIL contexts. Realizing has no boundaries. Realizing asks difficult questions: What are the deficiencies in CLIL classrooms? Why do they persist? What are the underlying principles which are core to CLIL? What can teachers and teacher educators do? How can some of the tensions between content and language be resolved?

Problematizing is the process of analyzing the questions raised, prioritizing the ones will be the focus of the growth cycle and starting to articulate underlying issues. This stage demands a holistic view of a wide range of learning scenarios, a critical analysis of research findings and their related theories both 't' and 'T,' alongside their relative impact on classroom practices. Theorizing, we suggest, is a collective activity where core readings are shared, debated and (re) interpreted to extract principles, to reconfigure meanings, and to grow ideas and express thoughts and concerns. Theorizing also involves critiquing classroom practices and searching for deeper understanding of the underlying issues – searching for

ways to reason through and address some of those difficult questions. This stage enables first designs of a model to be sketched involving visualizations and potential heuristic processes. Growing and diffusing the model involves constantly sharing iterations with groups of peers, experts, academics, teachers, teacher educators, and learners. Throughout this stage the voice of practitioners is critical. The growing stage asks more questions, raises more issues, explores implications, and prioritizes classroom practices at the macro level. Diffusing focuses on awareness raising and sharing understanding to a much wider group of practitioners on a transnational basis. This involves convincing the wider community of stakeholders, especially teachers, of the need to adopt and adapt classroom practice supported through teacher development. However, this is only feasible with evidence of its 'value-added' potential. Hence the processes of growing and practicing become interwoven since it is through practicing that essential evidence can be shared. Practicing can happen at any time during the growth cycle. Practicing is not about applying a set of principles handed down by experts. Rather it involves educators together exploring alternative ways of working at a micro level with ideas, providing feedback and feedforward in tandem with regular practices, adapting the model and thus 'owning' it.

It was in this context that the Graz Group was formed consisting of educators driven to making a significant contribution to unravelling CLIL and some of the gaps in current theories and classroom practices. Throughout the cycle, the core group planned to collaborate with international experts, teacher educators, and teachers. What follows is documentary evidence of the processes. The focus in this article is on the crucial role played by teachers and teacher educators based on the principles outlined above.

Practices

Realizing: Gathering Concerns

CLIL is at a watershed. Throughout the period of its rapid expansion across Europe, many studies focused on the potential benefits of CLIL. Drawing on foreign language and English as an additional language (EAL) contexts, less attention had been paid to the role of language in subject learning and to the quality and depth of subject learning in CLIL classrooms (Nikula et al. 2016). As Whittaker (2010) points out, 'the experience of learning "content" in a foreign language is very different from studying in a language which, whilst not being the students' L1, is generally used around them' (add page number). She underlines key differences between CLIL and second language contexts (the latter often associated with EAL) and emphasizes the challenges which force educators to rethink goals, methods, and possible achievement (see also Dalton-Puffer 2007, 2010; Pérez Vidal 2007; among others). There has been growing awareness of the current limitations of CLIL approaches across diverse contexts, theoretical interpretations, and political constraints. As Dalton Puffer (2007) observes, the CLIL approach had intuitive credibility, but was lacking a robust theoretical base. The growth cycle was started, therefore, by sharing key concerns with current practices across very different European countries with very different pedagogic exigencies– some very experienced with a long history of CLIL, others responding to political or monolingual agendas.

Despite the variety of backgrounds of the participants, common basic questions quickly emerged: Given the diverse interpretations of CLIL on a global scale, why is there little evidence to show how learners are benefitting over time in terms of their subject learning? What does an integrated approach to content and language learning really mean for teachers and learners? What kind of practical guidance is available to enable CLIL teachers to work effectively? Are there fundamental differences between language learning and language using for learning? What is the relationship between practices in first language classrooms and 'other' language classrooms? Where does teacher development and education fit in?

Alongside arguments focusing on the limitations of CLIL in terms of subject literacies and core principles to guide teachers, the notion that 'good' CLIL was based on the same principles as 'good' learning in any language remained constant. Whilst this repositions CLIL within broader educational debate, it also prioritizes finding a coherent pathway through the complexities of learning through diverse languages and contexts. These were the initial 'broad brush strokes' which were evidenced as our 'point de départ'.

Problematizing

Analyzing the questions and issues raised above enabled a shared focus to evolve across the group: to understand better the necessary conditions which foster 'deep learning' in contexts where language**s** are used as the medium of instruction. 'Languages' is used in the plural for two reasons: it was clear that first language classrooms were part of our concern; second, it was becoming more evident that using a language other than the learners' first as a medium of instruction did not discount the role of the first or other languages in the learning process. The issues and parameters of the roles of language in CLIL had been clearly set out by Llinares, Morton, and Whittaker (2012). They analyzed the complexity of linguistic and subject-related conceptual demands in integrated classrooms and drew heavily on theories from the fields of systemic functional linguistics, socio-cultural theory, and social models of second language acquisition. Increasingly, understanding the implications of integrating language and content learning was leading to revisiting work done several decades ago in studies on the needs of 'other' language users and their integration into mainstream education (see for example, seminal work by Mohan 1986).

However, being mindful of the need to prioritize conceptual development with subject specific procedures, skills, and strategies, the group agreed to an overarching focus on literacies across different subject areas. This decision resonates with the growing interest in

literacies and current concerns expressed following the results from the Organization for Economic Co-operation and Development's Program for International Student Assessment, indicating that one in five 15-year-olds in the EU still has 'insufficient' reading skills in the main language of schooling. Ways in which literacies might impact in CLIL or second and foreign language settings as well as first language settings continually guided the group to identify key readings, classroom accounts, and ideas. Underpinning our discussions at all times was: what does a teacher need to know about 'deep' learning in order to support the CLIL learner; and what are the optimal classroom conditions for learning?

Here follow some examples of explications and positioning debated throughout the problematizing stage underpinned by group discussions and tensions – an essential part of the process.

Shanahan and Shanahan's (2008) work on literacy development in first language settings highlights the need to enable learners to progress from basic and intermediate literacy levels to disciplinary literacy, through explicit teaching at all levels. It 'illustrates the increasing specialization of reading skills [where…] a similar pyramid-type structure could be used to accurately illustrate the declining amount of instructional support and assistance that is usually provided to students as they progress through the grades' (2008, 45-46). They advise the need for more explicit guidance to enable learners to understand how text is constructed differently in history, science or mathematics. This is consistent with similar findings in many other reports and research studies. For example, Lee, Quinn, and Valdéz (2013) examined the intersections between the learning of science and learning of language to identify the key features of the language of the science classroom. Their findings are explicit in documenting learner progression in science from everyday language moving towards the disciplinary features of register and genre. However, they advocate a shift away from teaching discrete language skills to supporting language development preferring instead

a focus on language-in-use environments: namely, supporting what learners can *do* with language.

Moreover, many studies acknowledge the need for transparent awareness-raising of the 'how' of different types of 'language using' to support learners in both first and other language settings to learn the rules for 'packaging' specific subject concepts in registers and genres. Gibbons (2008) goes further by focusing on classroom discourse as the mediator for 'pupil apprenticeship`' (Wells 1992, 291) into subject disciplines.

Yet, whilst the work of literacies in developing mainstream language across disciplines over the last four decades is well researched, it has not readily transferred to CLIL contexts – mainly due, as has already been mentioned, to the dominance of the role of language learning rather than 'language using for learning' in CLIL classrooms. Huttner and Smit (2014, 165) point out that whilst literacy development is a potential benefit in CLIL, it is not being realized especially in terms of 'its ability to [develop]…disciplines or subject-specific language and genre proficiency'. In bilingual settings, research into the notion of being literate across languages usefully conceptualized by Hornberger (2003) as a biliteracy continuum identifies the type of support which learners need in order to go beyond the norms and boundaries of monolingual literacy. Martin-Jones and Jones (2000) proposed the term 'multilingual literacies', whilst Garcia, Bartlett, and Kleifgen (2007) argue for this to be extended to *plurilingual practices* where an emphasis on literary practices involving more than one language focuses on agency and the learner – a position which resonated with our collective deliberations. The concept of *pluriliteracies* appeared to be one which was appropriate for classrooms where both second, foreign, and heritage languages were used as a medium for learning subjects across the curriculum and hence it was the 'working' concept adopted by the group.

In parallel, Goldoni (2008) presents a foreign language curriculum that combines multiliteracy, functionalist, and genre-based approaches. Multiliteracy, according to Goldoni, is understood as working with different genres and text-types and turning one text-type into another. She proposes a synthesis of different traditions to demonstrate how learners can go beyond the language levels associated with standard foreign language curricula by highlighting the crucial importance of literacy development, which echoes Lyster's (2007) call for a counterbalanced approach.

This brings us full circle back to positioning CLIL. Models such as the 4Cs Framework (content, cognition, communication, and culture, Coyle 2007) evolved to support teachers in identifying the components of CLIL (Coyle, Hood, and Marsh 2010) yet arguably this framework does not go far enough. It captures the 'what' rather than the 'how' of CLIL. With the objective of understanding better how literacies inform deep learning in CLIL, the following 'messy' issues were collated by our group - drawing on individual and collective networks and experiences - as requiring thematic attention:

- What is deep learning and what are the practices which promote it?
- How does a focus on literacies and subject specific literacies support progression in CLIL?
- Are we asking subject teachers to address the literacy demands in their subject in L1? If so, how do we convince them to work with literacies in the L2?
- How do we make language awareness visible to learners especially in terms of appropriate genre and register use?
- What exactly is meant by the *breadth of obligatory and optional genre moves*; *depth of content information* (Byrnes 2002)? and how do these influence knowledge construction?
- How are genres related to cognitive discourse functions?

- What kind of task sequencing will help students produce genre-appropriate texts in the content subjects taught in the foreign language?
- How can the concept of competencies (subject and other) be measured through progression?
- How can we help teachers design deeper learning experiences?

It was at this point in the growth cycle that theorizing began to weave together different strands which were debated by experts in the field and interpreted by educators through network meetings. The objective was to make ideas transparent and accessible for experimentation and critique by all stakeholders.

Theorizing

The process of theorizing involved dedicated time with teachers, teacher educators, and experts working together. Debate and discussion were captured on video and posted on a working website for further reflection. Diagrams and drawings were created to visualize thinking which was further analyzed, annotated, and revisited to co-construct reiterations. Key texts were shared and discussed using a range of digital media. Sources were analyzed and arguments deconstructed. New lines of thinking evolved in constructing a coherent logical pathway through the literature. Whilst the trigger had been on literacies in the broadest sense, only after the first network meeting did the group extend the focus to 'knowledge', which led us to ask what knowledge construction entails in terms of meaning-making and progression for subject content understanding. There was agreement that two intersecting axes – language/literacies and knowledge building were fundamental to processing (see Figure 2).

INSERT FIGURE 2

With agreement among participants that language is the means through which knowledge is constructed and evaluated, ways in which language enables learners to be 'apprenticed' differently in different disciplines began to surface. There was also consensus around using Polias's (2006) four 'knowledge and activity' domains for science (doing science, organizing scientific information, explaining events scientifically, and arguing aspects of science), each of which is expressed through a number of text genres. For example, procedure and practical report relates to the 'knowledge and activity' domain of *doing science*. Building on Polias's (2015) more recent work enabled us to synthesize what we collectively understood by 'knowledge construction' and to make more transparent connections between ways in which different kinds of 'knowledge and activity' domains required different kinds of language. One key text was Vollmer's (2011) study which analyzed language functions necessary to master lower secondary subject learning. He identified eight macro-functions embedded in the genres of each subject: negotiating, naming, describing, reporting/narrating, explaining, arguing/positioning, evaluating, simulating/modelling. These findings situate specific language functions at the interface of two dimensions, one linguistic and one cognitive, crucially highlighting the relation between language and thought. Dalton-Puffer's (2013) work with seven cognitive discourse functions (CDFs) was also fundamental to our theorizing in terms of ways of enabling learners to 'externalize cognitive processes' (Dalton-Puffer 2016, 32). She usefully warns, however, that language is 'fuzzy' and the boundaries between the function types (classifying, defining, describing, evaluating, explaining, exploring, and reporting) are neither exclusive nor clear since the construct itself is complex. Her prediction that the CDF construct may be useful as a heuristic for applied linguists and subject education specialists and 'serve as a common frame of reference when educators and researchers work together at better understanding CLIL' (Dalton-Puffer 2016, 54) resonated with our work.

A shared understanding of the role of language for learning evolved as different individuals selected their own 'think' texts: 'language itself provides the means for going beyond the immediate tangible meanings to accessing and developing less tangible more abstract meanings' (Polias 2006, 41); progression along knowledge pathways (Veel 1997) involves a range of skills and strategies including an 'ability to interpret and infer meaning from oral to written language, discern precise meaning and information from text, relate ideas and information, recognize the conventions of various genres and enlist a variety of linguistic strategies on behalf of a wide range of communicative purposes' (Dutro and Moran 2003, 230); there has been an 'absence of linguistic tools for capturing subject-specific literacies in ways that are sufficiently precise to be educationally useful' (Coffin 2006, 1). Within functional linguistics, however, the notion of genre to distinguish different types of texts has proved to be a useful 'way in' to looking at subject-specific language use; if we fail to directly teach academic ways of 'doing' and 'communicating' to our diverse students, what can result is the 'pedagogy of entrapment', a term used by Macedo (1994, 34) to refer to situations in which schools demand academic discourse skills and knowledge that is not specifically taught (Zwiers 2007).

Consequently, the next challenge became: What do we mean by language for learning? What is it we need to teach students? First visualizations by invited 'experts' and teacher educator participants at the first meeting of the extended group still looked very different (see Figures 3 and 4). However, common characteristics began to emerge: the axes became continua to emphasize that learner progression is not linear and causal (Figures 3 and 4); language was changed into communication (Figure 3) to avoid a possible identification with 'grammar' and instead to highlight a focus on the meaningfulness of the use of language. Essential features of language use were also identified, such as mode and register (Figure 4), and henceforth the notion of *pluriliteracies* became apparent (Figures 3 and 4).

INSERT FIGURE 3

INSERT FIGURE 4

A model was beginning to emerge. One of the participants suggested turning the model upside down, so that progression could be represented with a more intuitive upward movement. The discourse analysts in the group, on the other hand, agreed to capture all the different layers of the communication continuum through the concepts of purpose, mode, genre, and style. However, it was the suggestion by one of the participants to link the axes by using half arches, thus creating different size areas that represent students' ability to engage in increasingly complex meaning-making in more sophisticated and subject-appropriate ways, that represented a genuine leap forward. Now it was possible to represent the concept of knowledge pathways which were at the intersection of subject literacies and meaning-making thereon becoming deeper and more abstract.

Yet the challenge remained to explore how literacies involving more than one language could be meaningfully captured and interpreted by other practitioners which clarified how meaning-making relates to knowledge construction and to develop the idea of learners moving through increasingly difficult and abstract knowledge pathways without implying the linear development Figure 5 suggests.

INSERT FIGURE 5

At the same time, within the group and across networks, there was extensive self-reflection concerning the learning processes we were all experiencing in an increasingly ecological sense. In essence we were 'unknowingly' engaging in languaging across different cultural and linguistic contexts. Languaging, we agreed, was the use of language(s) to mediate cognitively complex acts of thinking and understanding which involved 'the process of making meaning and shaping knowledge and experience through language' (Swain 2006, 98). In this instance we were all responsible for ensuring that our own understanding could be

both refined and enacted through the very process of languaging and shared with others to develop a model we believed had to be accessible by those it was seeking to support. At this point, it was essential to involve a wider range of teachers from different contexts, linguistic backgrounds and cultures to grow the model, critique it and language it effectively.

Growing by Diffusing

Returning to the two axes, clarification around the language associated with knowledge building was urgently needed. Constantly reviewing and problematizing processes and the seminal texts used to guide our earlier thinking informed a network meeting with trans-European educators which started to unravel how aspects of language and literacies had meaning in CLIL contexts. Discussion (sometimes involving fundamental disagreements which had to be resolved), presentations, and debate emerged around the role of subject discourse in developing individual knowledge pathways whilst taking account of Dalton-Puffer's and Vollmer' work foregrounding cognitive discourse functions. It was only at this point that the next iteration of ideas began to emerge. The first was based on principles from systemic functional linguistic and in particular academic discourse functions which link language and literacies with meaning-making in any language. This linking required clarification by the practitioners to take account of what this means for CLIL teachers (e.g., the nature of tasks and sequencing). Thus, the concept of CDFs was fundamental to our reflection as our growing awareness of the need to consider how the existence of smaller discourse units bringing language and cognition together could allow learners to deepen their understanding of subject content. The second dissected the meaning of and implications for developing knowledge pathways involving learner progression. The pathway arcs thus became three-dimensional to account for the types of learning needed in different subject disciplines (i.e., doing, organizing, explaining, and arguing) as illustrated in Figure 6.

INSERT FIGURE 6

Yet, this iteration of the pathways model needed further scrutiny and critique by teachers and educators so that the processes could be interpreted, adapted and further developed in ways which made sense to classroom practitioners. Through a series of workshops, interviews, focus groups, and general discussions, five principles were argued and agreed through the teacher network as providing an essential bridge between academic and pedagogic discourses across different linguistic and social contexts.

We believe this to have been one of the most challenging yet fundamental stages in the growth cycle. The process was the voice of practitioners who wanted to dispel 'meaningless rhetoric around what they *should* be doing in the classroom' (teacher feedback TF3:2)[i] and transform theoretical and academic discourse into a theory of practice based on 'shared professional and pedagogic understanding of real learners in real classrooms' (teacher feedback TF2.5). The principles were articulated as follows:

- Conceptualizing learner progression
- Focusing on the learner
- Languaging for understanding
- Realizing cultural embeddedness
- Rethinking scaffolding for learner development

These five principles which, it could be argued, represent what 'good' teaching is all about in any language grew out of thinking, theorizing, discussing, visualizing, debating, and arguing - processes which were sometimes 'messy' and sometimes uncomfortable. In particular, extending the concept of cultural embeddedness to focus on the demands of different subject cultures needed careful deconstruction and reconstruction. We were creating our own knowledge pathways through an integrated approach to learning. We were documenting those processes through reiterating a theory of practice within the growth cycle.

A grid which was constructed during a session with teachers illustrates our *modus operandi*. Constructing the grid involved teachers in languaging their understanding of the principles based on active 'explaining' and 'arguing' for 'absent others'. An extract written by teachers exemplifies three of the five principles. The 'we' here refers to the teacher participants:

Principles	Meaning	Implications
Conceptualizing learner progression	Meaning-making by individual learners requires them to actively participate in different ways (depending on the kind of the subject knowledge at any given time) according to the internal rules of any particular subject (learning to behave like a historian, a mathematician, etc.) which are age and ability level appropriate. This involves learners in 'doing, organizing, explaining and arguing' their science or history or maths, which becomes increasingly more complex and abstract. Knowledge construction does not take place in a vacuum but involves specific language associated with the specific subject	Learner tasks need to take account of 'doing', 'organizing', 'explaining' and 'arguing' at each stage in an individual's learning development (not necessarily sequential). There are many examples of 'doing' tasks, 'organizing' tasks, fewer 'explaining' tasks and even fewer examples of 'arguing' tasks because learners need language appropriate to their level to 'argue' or discuss their subject content. This language needs to be explicitly taught and used (CDFs). The example of Lego bricks is useful (e.g., Duplo, Lego, Technik cars). It's no use having two Duplo wheels and two Lego wheels – the

	and the specific level of mastery. Pivotal to learning is the need to use subject-relevant language-relevant functions which match 'doing', 'organizing', 'explaining' and 'arguing' (i.e., cognitive discourse functions)	car doesn't get very far. Four Duplo wheels implies being able to appropriately argue at a simple level. Language tools (CDFs) are essential so we have to teach them explicitly and we have to know which ones are relevant to subject content. This implies teachers being more aware and analyzing texts and materials.
Focusing on the learner	Each individual needs help along the conceptual and communicating continuum – to progress knowledge pathways. If we emphasize language, learners will improve their communication skills without necessarily developing subject tools to support their learning. If we emphasize subject learning without taking account of the language needed for different kinds of learning, we are creating barriers to deep learning - learners will not have the appropriate language tools to think	High teacher expectations for learners' task performance is critical. See the Austin's butterfly video to trigger thinking. https://www.youtube.com/watch?v=hqh1MRWZjms We have to enable learners to language their learning and to equip them with tools especially language tools for using and practicing in task sequences. The task sequences have to do as the above box. We understand these tools by analyzing content carefully for CDFs. See box

	with.	below.
Languaging for understanding	We all need to language our thinking to internalize it. Language mediates our thinking. It is a process of continually refining thinking, meaning, and understanding. It enables learners to go from the concrete to the abstract, from surface understanding to deep learning. It means a continual sophistication of CDFs such as labeling, describing, arguing, reporting, modelling. Articulating learning needs tools and our classroom environment has to provide them.	We need to have a clearer understanding of how language relates to subject knowledge building.If we are asking our learners to explain or justify a point in science or history providing them with a sentence structure *if x then Y because* is not enough. We need to be clear about different types of explanations, which relate to different kinds of knowledge building in different subjects. We need to work together (subject experts, language experts) to share our knowledge and make it visible to ourselves first. We do some of this already (e.g., Bloom's higher order thinking) but it needs to connect transparently with activities in the subject bubbles.

New questions were raised based on the five principles as they were applied to different contexts and situations. Simultaneously, shared ownership of what was increasingly

referred to as 'our pluriliteracies model' had become a *Pluriliteracies approach to Teaching for Learning* (PTL). Thus, it was the drive to promote 'deep learning' as perceived as central to a Pluriliteracies approach by the educators in the workshops that led to a new iteration of the model (see Figure 7). Moreover, the FAQs written by educators for those who had not directly participated in the processes provide insights into teacher thinking in the cycle (http://pluriliteracies.ecml.at/en-us/Home/Q-and-A). The use of terms relating to the ecological processes of change and growth - such as rethink, reflect, change, community of practice - bears witness to lived experiences in experimenting understanding, and eventually practice, through active participation in the development of the approach. It had started by analyzing the gaps in classroom practices and through developing a set of argued and articulated principles based on bringing together theoretical knowledge and pedagogic understanding, a pathway had 'grown' owned by participants. Throughout these stages, however, the challenge of how to convince and support the wider professional community was constantly considered in terms of teacher agency and fundamental pedagogic changes required.

INSERT FIGURE 7

Practicing

Practicing is ongoing and takes time. Practicing is not the final stage in a sequence of events but the development and evidencing of process-oriented principles to support classroom praxis. Practicing demands convincing the wider community through providing accessible examples of practice and therefore invites ongoing evaluation and critical 'validation' by practitioners, learners and other educators. We use the term 'validation' in the sense of substantiation by practitioners based on classroom evidence and experience. Practicing tries

to unravel ways of enabling learners to make meaning in tried-out practical ways - for example, by focusing on nominalization or on reporting by connecting specific language elements along the communicating continuum with meaning-making along the conceptualizing continuum. Practicing details what doing and arguing history, art or science means. It involves teachers in planning and sequencing activities drawing from both continua to strengthen interconnecting learning spaces. Some of these activities may be familiar in EAL contexts but have remained hidden from CLIL classrooms. Practicing actualizes the guiding principles with learners at different ages and stages. It is reliant on a commitment to support and share theories of practice and persuade other practitioners to exercise agency through becoming involved through exemplifying 'signature pedagogies' (Shulman 2005). As such, digital media, including the web space, are crucial for providing communication tools and practical guidance (http://pluriliteracies.ecml.at).

As evidence collected by teacher-practitioners and teacher-researchers experimenting and adapting the approach gathers momentum, new interpretations emerge and further realizations become necessary. This is what we have now collectively understood as the growth cycle. Here follow a few of those examples to illustrate practices which contribute to 'validating' the model.

The ECML is supporting 'growing by diffusing' and 'practicing' through funding a series of teacher workshops across Europe led by educators and teachers (ECML and the Graz Group)[ii]. In the Czech Republic, the SELTIC project[iii] works on integrating science and English language teaching to develop awareness of the language of subject disciplines in both students and teachers. Similarly, in France a 'plurilingual and interdisciplinary' teacher training course for CLIL beginners is being created[iv], while in Finland the PTL has become a key element in the design of the new national curriculum for basic education[v]. Crucially, materials are now being developed, piloted and made available to teachers and teacher

educators[vi] to provide examples of the kinds of tasks and sequencing required to make learner progression more transparent. Increasingly, action research studies are providing further insights[vii].

The PTL approach is not and was never meant to be a panacea. Its dynamic construction and development, however, is a marker of how a transnational group of educators and researchers who find ways of collaborating in a focused way can become agents of change. In sum, experimenting an ecological approach has grown a space for analyzing some of the conceptual shortcomings inherent in CLIL from within, by conceptualizing a truely integrated model of learning that transcends CLIL and can be applied to learning any subject in any language.

Post script

There is no conclusion to this article. It does not present a critical evaluation of a research study with questions, methodology, data collection, analysis, and findings - yet all are present. Instead it attempts to document a growth cycle based on theories of practice seeking to understand better the necessary conditions for learning in contexts where more than one language is used. Its goal was to break down content-language barriers and to arrive at a more sophisticated yet accessible understanding of integrated learning with praxis at the very core and teachers as creators. In so doing we have collectively drawn on research and ideas from first language classrooms, bilingual classrooms, and other learning scenarios to develop a pluriliteracies approach to classroom learning which in essence foregrounds **teaching** for learning based on a set of five principles. Moving towards a continually developing model which unravels some of the complexities of theorizing classroom practices in integrated learning settings has enabled us to 'get beneath the surface' in ways which academics and theoreticians alone cannot.

This process is cyclical and, in line with 'knowledge ecology', encourages other teachers and teacher educators to exercise agency by growing their own theories of practice and their own evidence gathering to develop pedagogies which are sustainable and organic. Sustainability remains our greatest challenge as the growth cycle continues - making our collective understanding accessible, open to others, accountable, and adaptable in terms of criticality, guided by practitioner evidence. We believe that 'a dialectical relationship' has enabled us to bring together both small 't' theories and large 'T' theories (Rodgers 2006), which to reiterate van Lier's words 'differs from traditional ways of doing theory, research or practice' yet in essence is no different from any 'other thoughtful approach to work' (van Lier 1996, 24). Over the past three years, the construct of knowledge ecology has provided us a lens – a starting point – a first growth cycle. In the words of one teacher participant:

I know I will try different ways of doing things. It's encouraged me to think differently... different activities and ways of using language for learning. Making them aware of functions and how language is needed for thinking and conceptualizing. You know I think… it needs from me some…it looks like 3-D planning. It's like a puzzle made of little pieces. Together we can find more pieces – no matter what language we use! (TF 4.1)

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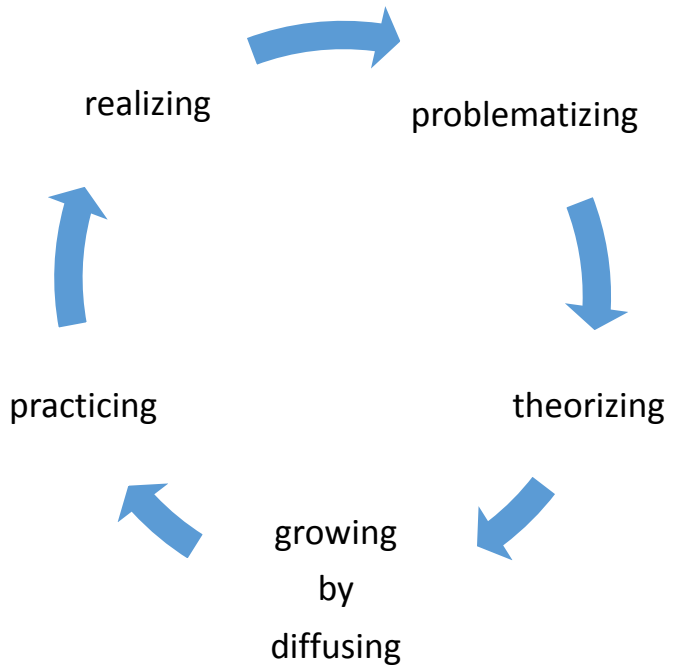

Figure 1. Our Growth Cycle

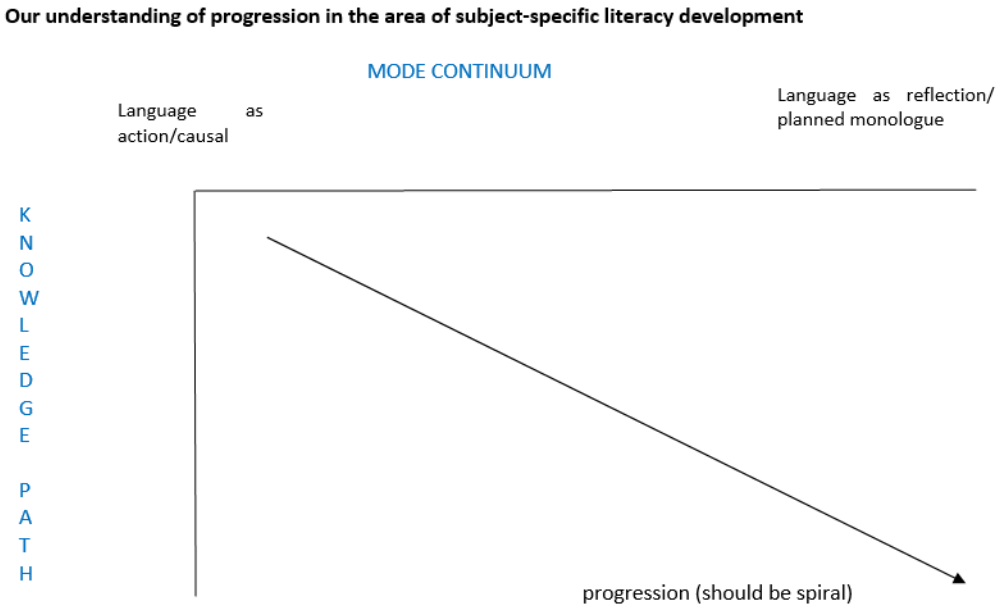

Figure 2. Identification of two key axes

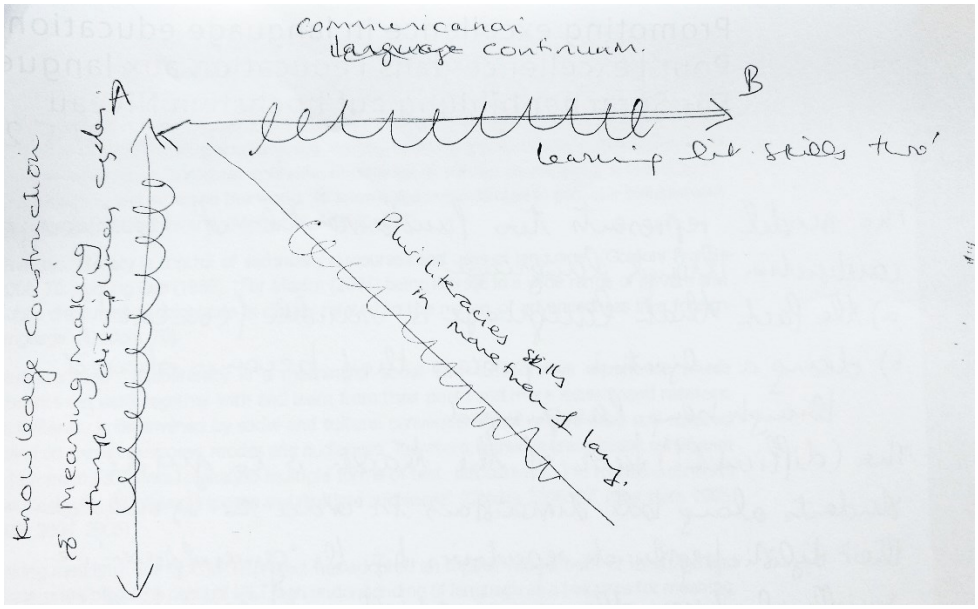

Figure 3. Emerging visualization by participants. Example 1

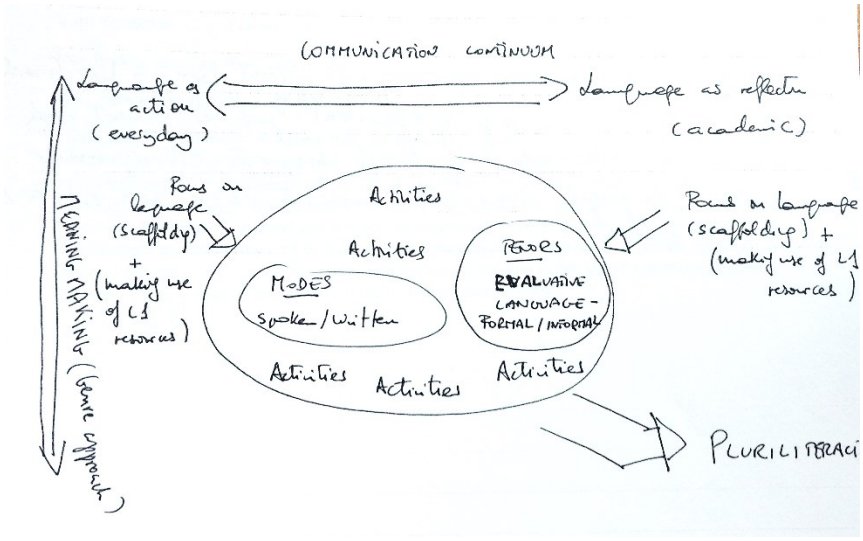

Figure 4. Emerging visualization by participants. Example 2

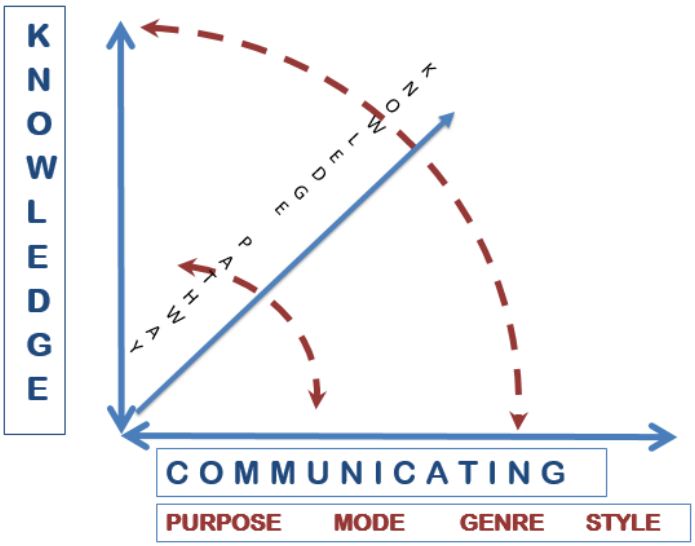

Figure 5. Linking two axes for increasing knowledge progression

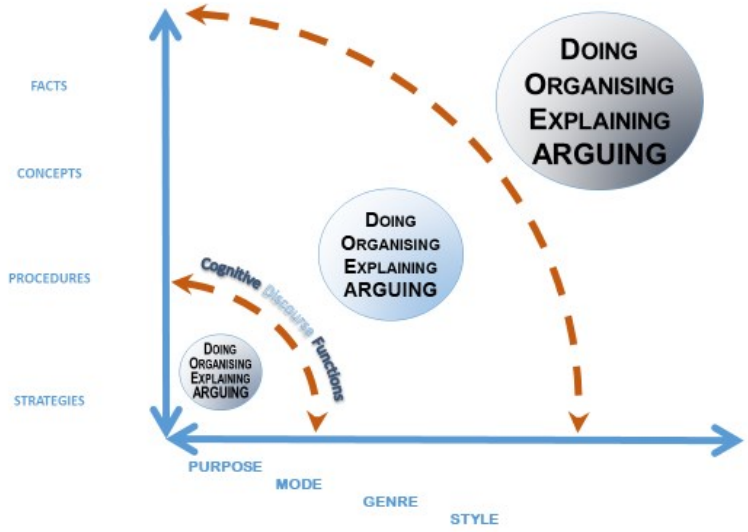

Figure 6. Visualizing the interrelationship between language and meaning-making through increasingly deeper and more abstract subject knowledge pathways

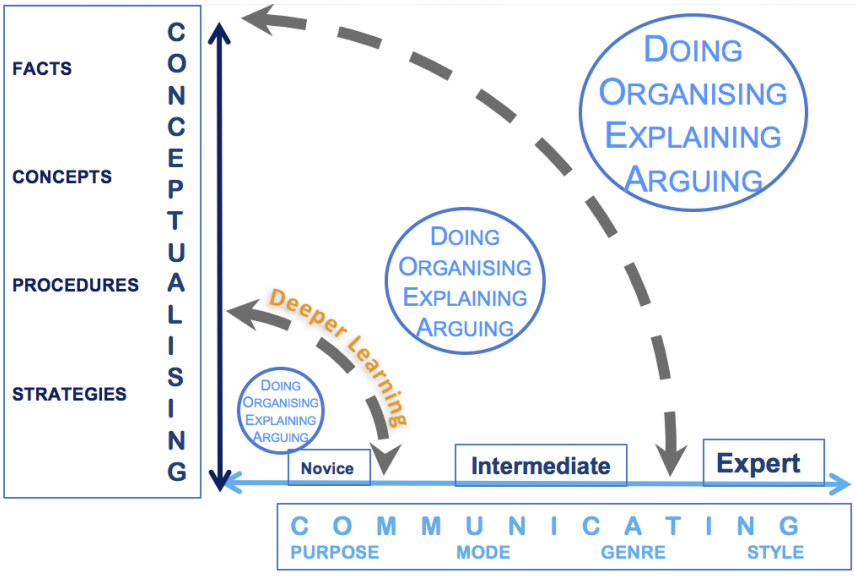

Figure 7. The current working model for a Pluriliteracies approach to Teaching for Learning (PTL)

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[i] Teacher Data is drawn from workshops in Austria, 2014 and in Italy, 2016.
[ii] For further information, contact ECML
[iii] http://www.iatefl.org/downloads/category/1-documents?download=426%3Ajana-jilkova-conference-poster-2016

[iv] Cécile Crespin, personal communication
[v] https://fissteps.wordpress.com/
[vi] For example see Teresa Kaub: *The Process of Corrosion* - materials for novice learners using English www.ecml.at/pluriliteracies.
[vii] Leila Eerikäeinen's study on ipads and tablets to support science discourse and scaffolding through mapping progression of ELLs in CLIL settings. For access contact the authors.